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DATASCI 266 NLP

Medical Subjective, Objective, Assessment, and Plan (SOAP) Summarization Project

Human Evaluation

Model: DistilBART Fine-tuned

**Instructions:**

The following five cases consist of two parts:

1. Doctor/Patient Dialogue (**Input Text**): The transcript of the conversation between the doctor and patient.
2. Predicted SOAP Summary (**Model Prediction/Inference**): The summary generated by the model is based on the input text (dialogue).

Your task is to evaluate the quality of the Model Prediction, which represents the model's output after being trained on 9,250 doctor/patient conversations.

Please assess the Model Prediction based on the following criteria:

1. **Accuracy**: Does the prediction correctly summarize the doctor/patient dialogue?
2. **Completeness**: Does the prediction include all key details from the doctor/patient dialogue?
3. **Consistency**: Does the prediction follow the SOAP format (Subjective, Objective, Assessment, Plan)?

**Steps for Review**

1. Carefully read through each case, including the Input Text and Model Prediction.
2. For each case, provide a score from 1 to 10 (1 = lowest, 10 = highest) at for:
  - Accuracy
  - Completeness
  - Consistency
3. Optionally, provide feedback or notes to highlight obvious inaccuracies in the Model Prediction.
4. Please provide your score and optional comments on this document and send it back to [scottbelarmino@berkeley.edu](mailto:scottbelarmino@berkeley.edu) or directly through email with the following format:  
Case #1  
Accuracy: 8  
Completeness: 7  
Consistency: 6  
Notes (optional): The model prediction/inference referred the patient as "she" vs. "he."  
The model's P (plan) is inconsistent with the given dialogue. The model's prediction is referring the patient as the mother vs. the son (i.e., the dialogue shows the mother talking with the doctor about her son, she is not the patient)

Thank you for your time and valuable feedback!

## **CASE #1**

### **Input Text:**

Doctor: Hello, can you please tell me about your past medical history?

Patient: Hi, I don't have any past medical history.

Doctor: Okay. What brings you in today?

Patient: I've been experiencing painless blurry vision in my right eye for a week now. I've also had intermittent fevers, headache, body aches, and a nonpruritic maculopapular rash on my lower legs for the past 6 months.

Doctor: Thank you for sharing that. Have you had any other symptoms such as neck stiffness, nausea, vomiting, Raynaud's phenomenon, oral ulcerations, chest pain, shortness of breath, abdominal pain, or photosensitivity?

Patient: No, only an isolated episode of left knee swelling and testicular swelling in the past.

Doctor: Do you work with any toxic substances or have any habits like smoking, drinking, or illicit drug use?

Patient: No, I work as a flooring installer and I don't have any toxic habits.

Doctor: Alright. We checked your vital signs and they were normal. During the physical exam, we found bilateral papilledema and optic nerve erythema in your right eye, which was greater than in your left eye. You also have a right inferior nasal quadrant visual field defect and a right afferent pupillary defect. Your muscle strength and reflexes were normal, and your sensation to light touch, pinprick, vibration, and proprioception was intact. We also noticed the maculopapular rash on your bilateral lower extremities.

Patient: Oh, I see.

Doctor: Your admitting labs showed some abnormal results. You have microcytic anemia with a hemoglobin of 11.6 gm/dL, hematocrit of 35.3%, and mean corpuscular volume of 76.9 fL. You also have hyponatremia with a sodium level of 133 mmol/L. Your erythrocyte sedimentation rate (ESR) is elevated at 33 mm/hr, and your C-reactive protein (CRP) is also elevated at 13.3 mg/L. Your urinalysis did not show any protein or blood.

Patient: Okay. What does that mean?

Doctor: These results could indicate an underlying inflammatory or infectious process. We also performed a lumbar puncture, which showed clear and colorless fluid, 2 red blood cells per microliter, and 56 white blood cells per microliter.

Patient: So, what's the next step?

Doctor: We need to investigate further to determine the cause of your symptoms. We'll run

additional tests and consult with a specialist to get a clearer understanding of your condition. In the meantime, we'll monitor your symptoms and provide supportive care. We'll keep you informed about any new findings and discuss the best course of treatment.

Patient: Alright, thank you, Doctor.

### **Model Prediction/Inference:**

S: The patient, a flooring installer, presents with a one-week history of painless blurry vision in the right eye, intermittent fevers, headache, body aches, and a nonpruritic maculopapular rash on the lower legs for the past 6 months. He denies neck stiffness, nausea, vomiting, Raynaud's phenomenon, oral ulcerations, chest pain, shortness of breath, abdominal pain, photosensitivity, or toxic habits.

O: Vital signs are within normal limits. Physical examination reveals bilateral papilledema, optic nerve erythema in the right eye, right inferior nasal quadrant visual field defect, and right afferent pupillary defect. Muscle strength and reflexes are normal, with intact sensation to light touch, pinprick, vibration, and proprioception. The maculopapular rash is noted on bilateral lower extremities. Laboratory findings include microcytic anemia with hemoglobin at 11.6 gm/dL, hematocrit at 35.3%, mean corpuscular volume at 76.9 fL, hyponatremia with a sodium level of 133 mmol/L, elevated ESR at 33 mm/hr, and elevated CRP at 13.3 mg/L. Urinalysis shows no protein or blood. Lumbar puncture reveals clear and colorless fluid, 2 RBCs per microliter, and 56 WBCs per microliter.

A: The clinical presentation and laboratory findings suggest a possible inflammatory or infectious process, considering the elevated ESR and CRP, microcytic anemia, hyponatremia, and elevated inflammatory markers. Differential diagnoses could include other inflammatory or infectious causes, but these are less likely given the specific findings on lumbar puncture and clinical presentation.

P: Plan to conduct further diagnostic tests including blood cultures, imaging, and possibly a biopsy to confirm the diagnosis. Referral to a rheumatologist for further evaluation and management of anemia and hyponatremia is necessary. Continue supportive care and monitor vital signs closely. Educate the patient on the importance of reporting new symptoms or changes in his condition. Ensure follow-up appointments are scheduled to assess progress and adjust the treatment plan as necessary.

### **Evaluation Scores (score from 1 to 10)**

**Accuracy:** Does the prediction correctly summarize the doctor/patient dialogue?

**Completeness:** Does the prediction include all key details from the doctor/patient dialogue?

**Consistency:** Does the prediction follow the SOAP format (Subjective, Objective, Assessment, Plan)?

**Feedback (optional):**

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## **CASE #2**

### **Input Text:**

Doctor: Hello, I understand that you're a 7-year-old boy with congenital bilateral sensorineural deafness, and you've had a failed right cochlear implant. Is that correct?

Patient: Yes, doctor.

Doctor: We recently conducted a Magnetic Resonance Imaging (MRI) before transferring you to the operating theatre for an ABI insertion. During the MRI, your airway was secured with a size 5.5 mm internal-diameter uncuffed ETT. Did you experience any discomfort during the MRI?

Patient: No, it was okay.

Doctor: Great. Now, during the surgery, we will be performing intraoperative neurophysiology monitoring, which includes brainstem auditory sensory evoked potentials, brainstem mapping of CN IX, X, XI, XII and their motor nuclei, and corticobulbar tract motor-evoked potential (MEP). This will help us monitor your nerves during the procedure.

Patient: Okay, doctor.

Doctor: Our anesthesia team will be responsible for the lead placement for CN IX, X, XI, XII. We will use a 32 mm by 29 mm laryngeal electrode for CN X monitoring (Fig.). To ensure optimal electrode placement on the tracheal tube, we positioned you as intended for surgery (right lateral) and identified the depth of ETT corresponding to the laryngeal inlet using a C-MAC Laryngoscope.

Patient: Hmm, alright.

Doctor: This corresponded to 6 cm at vocal cords (15 cm at lips). We then prepared a new #5.5 uncuffed ETT with the laryngeal electrodes (Fig.) and re-intubated you, in keeping with the measurements.

Patient: Okay, got it.

Doctor: For CN IX placement, we put a pin electrode on the ipsilateral soft palate. For CN XII, we placed electrodes on the anterior tongue.

Patient: I see.

Doctor: To stabilize the tracheal tube, we used rolled up gauzes on either side of it (Fig.), which also acted as a bite block.

Patient: Alright, doctor.

Doctor: During the surgery, we will administer Total Intravenous Anesthesia (TIVA) which includes propofol (Paedsfusor Target Control Infusion, target plasma concentration 3.5–5.0 mcg/ml) and remifentanyl (0.08–0.3 mcg/kg/min).

Patient: Will I feel any pain during the surgery?

Doctor: No, the anesthesia will ensure that you remain comfortable and pain-free throughout the procedure.

Patient: That's good to know.

Doctor: After the surgery, we will closely monitor your recovery and provide any necessary follow-up care. It's important that you follow our instructions to ensure the best possible outcome.

Patient: Yes, doctor. I will.

Doctor: Great. If you or your family have any questions or concerns, please don't hesitate to reach out to us.

Patient: Thank you, doctor. We appreciate your help.

### **Model Prediction/Inference:**

S: The patient is a 7-year-old boy with congenital bilateral sensorineural deafness and a history of a failed right cochlear implant. He reports no discomfort during the MRI.

O: The patient's airway was secured with a size 5.5 mm internal-diameter uncuffed ETT. Intraoperative neurophysiology monitoring will include brainstem auditory sensory evoked potentials, brainstem mapping of CN IX, X, XI, XII and their motor nuclei, and corticobulbar tract motor-evoked potential (MEP). A 32 mm by 29 mm laryngeal electrode was used for CN X monitoring. The depth of ETT corresponding to the laryngeal inlet was identified using a C-MAC Laryngoscope. A new #5.5 uncuffed ETT was prepared with the laryngeal electrodes and re-intubated. CN IX placement was placed on the ipsilateral soft palate, and CN XII placement was placed on the anterior tongue. Total Intravenous Anesthesia (TIVA) will be administered with propofol (Paedsfusor Target Control Infusion, target plasma concentration 3.5–5.0 mcg/ml) and remifentanyl (0.08–0.3 mcg/kg/min).

A: The primary diagnosis is congenital bilateral sensorineural deafness with a history of a failed right cochlear implant. The patient is scheduled for an ABI insertion using a laryngeal electrode for CN IX, X, XI, XII. The procedure will involve intraoperative neurophysiology monitoring, brainstem auditory sensory evoked potentials, brainstem mapping of CN IX, X, XI, XII and their motor nuclei, and corticobulbar tract motor-evoked potential (MEP).

P: The anesthesia team will administer Total Intravenous Anesthesia (TIVA) with propofol (Paedsfusor Target Control Infusion, target plasma concentration 3.5–5.0 mcg/ml) and remifentanyl (0.08–0.3 mcg/kg/min). Post-surgery, the patient will be closely monitored for recovery and provide follow-up care. The patient and his family will be educated about the procedure, expected outcomes, and the importance of adhering to postoperative instructions. Regular follow-up appointments

### **Evaluation Scores (score from 1 to 10)**

**Accuracy:** Does the prediction correctly summarize the doctor/patient dialogue?

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**Consistency:** Does the prediction follow the SOAP format (Subjective, Objective, Assessment, Plan)?

**Feedback (optional):**

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### **CASE #3**

#### **Input Text:**

Doctor: Hello, we've received your results from the ultrasound we performed in April 2017. It seems that there is a single thyroid nodule present in your left lobe, measuring 1 cm in its largest diameter. We also performed a complete biochemical screening, including tests for TSH, autoantibodies, and calcitonin.

Patient: Hmm, what did the screening results show, doctor?

Doctor: Your calcitonin level was found to be slightly elevated at 40 ng/mL, which is above the normal range of 1-4.8 ng/mL. To further investigate, we performed a stimulation test with intravenous calcium.

Patient: And what did the stimulation test show?

Doctor: After the stimulation, your calcitonin levels peaked at 1420 ng/mL, which indicates that surgical treatment is necessary. As a result, you underwent a total thyroidectomy and central neck dissection on the side of the tumor.

Patient: Yes, I remember that. How was my recovery after the surgery?

Doctor: Your postoperative course was uneventful, with only a slight hypocalcemia recorded in the first day. However, it completely recovered 48 hours after the surgery, and you were discharged.

Patient: That's good to hear. What did the tests on the removed tissue show?

Doctor: Immunohistochemistry performed on the thyroid nodule revealed the presence of a medullary thyroid cancer (MTC) measuring 1 cm. It is composed of cells with an eosinophilic cytoplasm and has a predominantly expansive growth pattern. A histological examination showed that the tumor cells were positive for calcitonin, Chromogranin A, Synaptophysin, and TTF-1, but negative for the presence of amyloid.

Patient: What about the other surrounding tissue?

Doctor: Focal foci of C-cells hyperplasia were spread throughout the entire gland. However, none of the lymph nodes in the central compartment showed any signs of metastases.

Patient: That's a relief. What other tests were done on the tissue?

Doctor: To perform a more detailed analysis, we treated formalin-fixed paraffin-embedded sections with antigen retrieval using citrate buffer at high pH. They were then immunolabeled with a rabbit monoclonal anti-calcitonin antibody and incubated with appropriate fluorescent secondary antibodies.

Patient: So, what does this all mean for my condition?

Doctor: Overall, these results confirm the presence of medullary thyroid cancer. Fortunately,

none of the lymph nodes showed signs of metastases, which is a positive sign. It's important to continue with regular follow-up appointments and monitoring to ensure proper management of your condition.

**Model Prediction/Inference:**

S: The patient underwent a total thyroidectomy and central neck dissection for a medullary thyroid cancer (MTC) in the left lobe. Postoperative recovery was uneventful, with a slight hypocalcemia but complete recovery 48 hours post-surgery.

O: Ultrasound revealed a 1 cm thyroid nodule in the left lobe. Complete biochemical screening showed elevated calcitonin levels at 40 ng/mL (normal range: 1-4.8 ng/mL), peaking at 1420 ng/mL post-stimulation. Immunohistochemistry confirmed the presence of a medullary thyroid cancer (MTC) with cells positive for calcitonin, Chromogranin A, Synaptophysin, and TTF-1, but negative for amyloid. Focal foci of C-cells hyperplasia were present throughout the entire gland, with no lymph node metastases.

A: The primary diagnosis is medullary thyroid cancer, with no evidence of metastasis in the lymph nodes. The elevated calcitonin levels and the presence of C-cell hyperplasia are favorable prognostic factors.

P: The patient is advised to continue regular follow-up appointments and monitoring to manage and detect any recurrence or complications early. Further treatment options may be considered based on the patient's response to initial treatment and any new symptoms.

**Evaluation Scores (score from 1 to 10)**

**Accuracy:** Does the prediction correctly summarize the doctor/patient dialogue?

**Completeness:** Does the prediction include all key details from the doctor/patient dialogue?

**Consistency:** Does the prediction follow the SOAP format (Subjective, Objective, Assessment, Plan)?

**Feedback (optional):**

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## **CASE #4**

### **Input Text:**

Doctor: Hello, can you tell me what brought you here today?

Patient: Hi, I've been having a progressive headache, nausea, and vomiting for about a week. I also noticed some right-side weakness, ptosis, and diplopia.

Doctor: I see. Let's talk about when you first presented with these symptoms. Did you experience any conscious disturbance?

Patient: Yes, I had an acute onset conscious disturbance, and my Glasgow Coma Scale was E3VaM5 at the hospital.

Doctor: Okay, we performed a brain computed tomography and found an enhanced brain tumor with necrotic cystic changes. The tumor is located in your left temporal lobe with upward extension to the left basal ganglion and periventricular region, causing perifocal edema and midline shift.

Patient: Oh, that sounds serious.

Doctor: Yes, it's a serious condition. We performed an emergent craniectomy for tumor removal in December 2006. The pathology revealed pleomorphic, hyperchromatic cells with glassy, astrocytic cytoplasm, as well as hypercellularity, microvascular proliferation, and necrosis, consistent with the diagnosis of classic GBM.

Patient: What happened after that?

Doctor: You underwent radiotherapy a month later, followed by chemotherapy with temozolomide for six months. Your performance status improved to a Karnofsky Grade of 70, and your clinical condition was stable thereafter.

Patient: That's good to hear.

Doctor: However, a follow-up brain magnetic resonance imaging (MRI) in June 2014 revealed a new enhanced nodular lesion, about 1.1 cm in diameter, at your left temporal base. The brain MRI in October 2014 showed a progressive change in lesions, with a maximum of 3.0 cm in diameter.

Patient: What did you do about that?

Doctor: We performed another surgery for gross tumor removal. Histologically, the tumors showed the oligodendroglial component. Neoplastic cells also showed isocitrate dehydrogenase 1 (IDH1) positivity, diffuse p53 positivity, and O6-methylguanine-DNA methyltransferase (MGMT) negativity as revealed by immunostaining.

Patient: Hmm, I see.

Doctor: During your follow-up, we noticed signs of increased intracranial pressure in May 2015.



As a result, you received a third debulking surgery.

Patient: What did the third pathology reveal?

Doctor: The third pathology revealed both GBM- and PNET-like components. In immunohistochemistry, the PNET-like component exhibited positivity for synaptophysin and CD56 and focal weak positivity for glial fibrillary.

Patient: What's the next step for my treatment?

Doctor: We will continue to monitor your condition closely and provide further treatment options as needed. It's important to follow up with us regularly to ensure the best possible care.

Patient: Thank you, I appreciate your help.

### **Model Prediction/Inference:**

S: The patient reports a one-week history of progressive headache, nausea, vomiting, right-side weakness, ptosis, and diplopia. Initially, the patient experienced an acute onset conscious disturbance. The patient's Glasgow Coma Scale was E3VaM5 at the hospital.

O: Initial brain computed tomography revealed an enhanced brain tumor with necrotic cystic changes in the left temporal lobe, extending to the left basal ganglion and periventricular region, causing perifocal edema and midline shift. Post emergent craniectomy in December 2006, pathology indicated pleomorphic, hyperchromatic cells with glassy, astrocytic cytoplasm, hypercellularity, microvascular proliferation, and necrosis. Post-radiotherapy and chemotherapy, the patient's performance status improved to a Karnofsky Grade of 70. However, a follow-up MRI in June 2014 showed a new enhanced nodular lesion approximately 1.1 cm in diameter at the left temporal base. A subsequent MRI in October 2014 indicated a progressive change in lesions, with a maximum of 3.0 cm in diameter. Histological findings included oligodendroglial component, IDH1 positivity, diffuse p53 positivity, and O6-methylguanine-DNA methyltransferase (MGMT) negativity. A third debulking surgery in May 2015 revealed both GBM- and PNET-like components, with immunohistochemistry showing positivity for synaptophysin and CD56 and focal weak positivity for glial fibrillary.

A: The primary diagnosis is classic gliomyeloid malignancy (GBM), with a history of multiple treatments including craniectomy, radiotherapy, and chemotherapy. The patient's condition has been complicated by increased intracranial pressure, leading to multiple debulking surgeries.

P: The management plan includes close monitoring of the patient's condition with regular follow-ups to assess treatment efficacy and manage any complications. Further treatment options may be considered based on the progression of the disease and response to initial treatments. The patient will be educated on the importance of adherence to follow-up appointments and lifestyle modifications to manage symptoms effectively. Referral to a neurologist for further evaluation and management of intracranial pressure is recommended.

### **Evaluation Scores (score from 1 to 10)**

**Accuracy:** Does the prediction correctly summarize the doctor/patient dialogue?

**Completeness:** Does the prediction include all key details from the doctor/patient dialogue?

**Consistency:** Does the prediction follow the SOAP format (Subjective, Objective, Assessment, Plan)?

**Feedback (optional):**

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## **CASE #5**

### **Input Text:**

Doctor: Hello, I understand that you have been dealing with hepatocellular carcinoma and had a liver transplantation from a living donor about a year ago. How have you been feeling recently?

Patient: Well, lately I developed some severe abdominal pain that has been really bothersome.

Doctor: I'm sorry to hear that. It seems like you have developed severe acute pancreatitis. When you were admitted to the hospital, we started a continuous intravenous infusion of fentanyl at 1200 µg/day to control your abdominal pain. Over the course of 10 days, we increased the dose according to your pain intensity, reaching 2400 µg/day (MED 240 mg/day). How has your pain been since then?

Patient: It's been a little bit better with the fentanyl, but it's still quite painful.

Doctor: I see. In addition to the fentanyl, we have also administered a pancreatic enzyme inhibitor, antibiotic, and fluid to help alleviate the pancreatitis and your abdominal pain. We have gradually reduced the continuous fentanyl infusion, and it was discontinued after reaching 240 µg/day (10% of the maximum dose). However, you mentioned experiencing nausea/vomiting, elevated blood pressure, and restlessness 12 hours after discontinuation. Is that correct?

Patient: Yes, that's right. It was pretty uncomfortable.

Doctor: I apologize for the discomfort. To alleviate these symptoms, we resumed the continuous intravenous fentanyl infusion at 240 µg/day, and the symptoms disappeared. However, restlessness occurred each time the dose was reduced, so we decided to initiate a transdermal fentanyl patch to taper the opioid more slowly. How has that been working for you?

Patient: The patch has been helpful; I've noticed a difference.

Doctor: Good to hear. Unfortunately, your pancreatitis with abdominal pain recurred transiently one month later. Therefore, we resumed the continuous intravenous fentanyl infusion and titrated it to 600 µg/day. We have been gradually decreasing the dose daily (600, 300, 240, 180, 120, and 60 µg/day). As your pancreatitis has improved, we were able to discontinue the fentanyl without causing withdrawal symptoms. The discontinuation was finally completed 64 days after the onset of withdrawal symptoms. How are you feeling now?

Patient: I'm feeling much better now, thank you.

Doctor: That's great to hear. Make sure to continue monitoring your symptoms and let us know if you experience any discomfort or changes in your condition. We will continue to follow up with you to ensure your recovery goes smoothly.

### **Model Prediction/Inference:**

S: The patient, with a history of hepatocellular carcinoma and liver transplantation from a living donor approximately one year ago, reports severe abdominal pain that has been bothersome recently. The pain has slightly improved with fentanyl but is still quite painful. The patient experienced nausea/vomiting, elevated blood pressure, and restlessness 12 hours after discontinuation of fentanyl, which resolved with a transdermal fentanyl patch.

O: Initial treatment included a continuous intravenous infusion of fentanyl at 1200 µg/day, later increased to 2400 µg/day (MED 240 mg/day). The patient was treated with a pancreatic enzyme inhibitor, antibiotic, and fluid. Subsequent treatments included a pancreatic enzyme inhibitor, antibiotic, and fluid. The continuous fentanyl infusion was discontinued after reaching 240 µg/day (10% of the maximum dose). The patient experienced nausea/vomiting, elevated blood pressure, and restlessness 12 hours post-discontinuation, which resolved. However, restlessness occurred each time the dose was reduced, prompting the initiation of a transdermal fentanyl patch. The patient's pancreatitis recurred transiently one month later, necessitating a titration to 600 µg/day and a gradual decrease of the fentanyl dose.

A: The primary diagnosis is severe acute pancreatitis secondary to hepatocellular carcinoma, complicated by fentanyl-induced pancreatitis. Differential diagnoses could include other causes of abdominal pain and pain, but these are less likely given the patient's history and current symptomatology.

P: Continue monitoring the patient's pancreatitis and pain levels closely. Maintain the transdermal fentanyl patch to manage withdrawal symptoms. Schedule regular follow-ups to monitor the patient's recovery and manage any potential complications. Educate the patient on the importance of reporting any new symptoms or changes in condition. Consider consultation with a gastroenterologist for ongoing management of hepatocellular carcinoma and a hepatologist for liver transplantation.

### **Evaluation Scores (score from 1 to 10)**

**Accuracy:** Does the prediction correctly summarize the doctor/patient dialogue?

**Completeness:** Does the prediction include all key details from the doctor/patient dialogue?

**Consistency:** Does the prediction follow the SOAP format (Subjective, Objective, Assessment, Plan)?

**Feedback (optional):**

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## **CASE #6**

### **Input Text:**

Doctor: Hello, how can I help you today?

Patient: Hi, I've been experiencing some pain in my right chest lately.

Doctor: I see. Can you tell me more about your background? Are you a smoker?

Patient: No, I am a non-smoker. I work as an engineer for a gas company.

Doctor: Alright. Have you had any exposure to asbestos in your workplace?

Patient: No, I don't think so.

Doctor: Let's perform a physical examination to check for any issues in your lungs. [After examination] I noticed a reduction of lung sounds at the right lung basis, but no clinical sign of autoimmune disease.

Patient: Hmm, what could be causing the chest pain then?

Doctor: We will need to perform a chest X-ray (CXR) to investigate further. [After CXR] The results show a considerable reduction in the right lung volume with associated right pleural effusion.

Patient: What does that mean?

Doctor: It means there is fluid around your right lung. We should perform more tests to determine the cause. [After tests] All serological, autoimmune, and microbiological tests came back negative. Let's do a computed tomography (CT) scan to get a better view. [After CT] The CT scan revealed a slight reduction in right lung volume with associated right pleural effusion and pleural thickening.

Patient: What's the next step?

Doctor: We will conduct a supplemental investigation to rule out any history of trauma, tuberculosis, and pneumothorax. We will also perform an echocardiography to exclude pulmonary hypertension, and a diaphragm dysfunction test through phrenic nerve stimulation. [After investigations] All tests were negative.

Doctor: We'll proceed with a total body positron emission tomography-computed tomography (PET-CT) to check for any abnormalities. [After PET-CT] There was a low-intensity hyper-accumulation of 18-FDG in the right pleura with increased concentration in the basal, middle, and posterior pleural surface.

Patient: What's the next step, then?

Doctor: We'll perform a surgical lung biopsy (SLB) to identify the issue. [After SLB] The biopsy identified non-specific fibrinous pleurisy, but the search for neoplastic or infectious cells was negative.

Doctor: Unfortunately, your forced vital capacity (FVC) has dropped significantly over the previous 3 years, and you have developed shortness of breath on exertion. I am going to prescribe a prednisolone course to help with the symptoms.

Patient: Okay, thank you.

Doctor: Sadly, your condition has worsened with the onset of restrictive respiratory failure. It's important to keep a close eye on your health and report any changes.

[2 weeks later]

Doctor [to patient's family]: I am sorry to inform you that the patient passed away due to a cardiac ischemic attack. The autopsy excluded mesothelioma or other pleural neoplastic diseases but reported the presence of diffuse fibrinous pleurisy.

### **Model Prediction/Inference:**

S: The patient, a non-smoker, reported experiencing pain in the right chest. He works as an engineer for a gas company. He denied any exposure to asbestos in his workplace.

O: Physical examination revealed a reduction in lung sounds at the right lung basis but no signs of autoimmune disease. Chest X-ray showed a significant reduction in right lung volume with associated right pleural effusion. Initial serological, autoimmune, and microbiological tests were negative. CT scan indicated a slight reduction in right lung volume with associated right pleural effusion and pleural thickening. Echocardiography and diaphragm dysfunction test through phrenic nerve stimulation were negative. PET-CT revealed low-intensity hyper-accumulation of 18-FDG in the right pleura with increased concentration in the basal, middle, and posterior pleural surface. Surgical lung biopsy identified non-specific fibrinous pleurisy, negative for neoplastic or infectious cells. The patient's forced vital capacity (FVC) has significantly decreased over the past 3 years, and he developed shortness of breath on exertion.

A: The primary diagnosis was diffuse fibrinous pleurisy with associated right pleural effusion and pleural thickening. Differential diagnoses initially included trauma, tuberculosis, pneumothorax, and pulmonary hypertension, which were ruled out through investigations.

P: The patient was prescribed a prednisolone course to manage symptoms of pleural effusion and pleural thickening. Due to the onset of restrictive respiratory failure, he was advised to monitor his health closely and report any changes. Unfortunately, the patient passed away due to a cardiac ischemic attack. Autopsy results excluded mesothelioma and other pleural neoplastic diseases.

### **Evaluation Scores (score from 1 to 10)**

**Accuracy:** Does the prediction correctly summarize the doctor/patient dialogue?

**Completeness:** Does the prediction include all key details from the doctor/patient dialogue?

**Consistency:** Does the prediction follow the SOAP format (Subjective, Objective, Assessment, Plan)?

**Feedback (optional):**

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## **CASE #7**

### **Input Text:**

Doctor: Hi there, I see you've presented with body weight loss. Can you tell me about any medical history you have?

Patient: Yes, I have hypertension and diabetes, but both are well-controlled by medication.

Doctor: Okay, thank you for letting me know. We've done some laboratory tests, and the data shows that your hemoglobin is decreased at 9.1 g/dl. However, your tumor markers are within normal limits.

Patient: Oh, I see.

Doctor: We performed a colonoscopy which revealed a circumferential tumor in your sigmoid colon. A histological examination of the biopsy showed that it's a RAS-mutant adenocarcinoma. The RAF mutational status was not investigated.

Patient: Hmm, that doesn't sound good.

Doctor: A contrast-enhanced CT scan showed irregular colonic wall thickening with massive involvement of your urinary bladder. There were enlarged regional lymph nodes suggestive of metastases but no distant metastasis. Your pretreatment diagnosis is LACC stage IIIC (T4bN2M0).

Patient: So, what's the treatment plan for me?

Doctor: We started with a loop transverse colostomy, similar to some other cases. We then planned 6 courses of chemotherapy with CAPOX plus bevacizumab.

Patient: How did that go?

Doctor: You eventually received 5 courses of CAPOX plus bevacizumab and the remaining 1 course without oxaliplatin due to grade 2 neurotoxicity. A follow-up CT after the neoadjuvant chemotherapy showed significant tumor shrinkage.

Patient: That's good news.

Doctor: Yes, it is. Thereafter, we performed a sigmoid colectomy and partial resection of your bladder. The postoperative course was uneventful, and you did not suffer from neurogenic voiding dysfunction or urinary incontinence.

Patient: I'm relieved to hear that.

Doctor: Pathological examination revealed that tumor cells or degeneration was present in less than one third of the entire lesion, which was consistent with grade 1a effect according to the Japanese Classification of Colorectal Carcinoma.

Patient: So, what's the final diagnosis?

Doctor: The final diagnosis is ypT4b, ypN0, M0, ypStage IIC. You subsequently received 8

courses of adjuvant chemotherapy with capecitabine alone.

Patient: And how am I doing now?

Doctor: There has been no recurrence at 16 months after the initial diagnosis, which is a very positive outcome.

Patient: That's great to hear. Thank you for all your help, Doctor.

Doctor: You're welcome. We will continue to monitor your progress and provide any necessary support.

### **Model Prediction/Inference:**

S: The patient, with a history of hypertension and diabetes, presented with body weight loss. He reported no other significant medical history.

O: Laboratory tests showed decreased hemoglobin at 9.1 g/dl (normal range: 13.8-17.2 g/dl for men, 12.1-15.1 g/dl for women). Tumor markers were within normal limits. Colonoscopy revealed a circumferential tumor in the sigmoid colon, diagnosed as RAS-mutant adenocarcinoma. A contrast-enhanced CT scan showed irregular colonic wall thickening, massive involvement of the urinary bladder, and enlarged regional lymph nodes suggestive of metastases but no distant metastasis. Post-chemotherapy follow-up CT post-neoadjuvant chemotherapy showed significant tumor shrinkage. A sigmoid colectomy and partial bladder resection were performed, with no neurogenic voiding dysfunction or urinary incontinence reported. Pathological examination revealed tumor cells or degeneration in less than one third of the lesion, consistent with grade 1a effect according to the Japanese Classification of Colorectal Carcinoma. Final diagnosis was ypT4b, ypN0, M0, ypStage IIC.

A: The primary diagnosis is RAS-mutant adenocarcinoma of the sigmoid colon, stage IIIC (T4bN2M0). The patient underwent successful chemotherapy with CAPOX plus bevacizumab, followed by sigmoid colectomy and bladder resection. There has been no recurrence at 16 months post-diagnosis.

P: The patient will continue with regular follow-up visits to monitor for any signs of recurrence or new symptoms. Further adjuvant chemotherapy with capecitabine alone is planned. The patient will be educated on signs of recurrence and encouraged to report any new symptoms promptly. Referral to oncology for further evaluation and management of his diabetes and hypertension is recommended.

### **Evaluation Scores (score from 1 to 10)**

**Accuracy:** Does the prediction correctly summarize the doctor/patient dialogue?

**Completeness:** Does the prediction include all key details from the doctor/patient dialogue?

**Consistency:** Does the prediction follow the SOAP format (Subjective, Objective, Assessment, Plan)?

**Feedback (optional):**

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## **CASE #8**

### **Input Text:**

Doctor: Hello, I heard you have a 6-month history of swelling in the left floor of your mouth, and you were referred to our institution. How can I help you today?

Patient: Yes, that's right. I've been experiencing some difficulty in swallowing, but I haven't had any pain or tongue paralysis.

Doctor: I see. Let's perform an intraoral examination to better understand the issue. Hmm, I can see a well-defined  $3.5 \times 3 \times 2$  cm-sized solid, spherical submucosal nodule adjacent to the sublingual gland. It's covered with light bluish smooth mucus. Do you feel any pain when I apply pressure to the tumor?

Patient: Yes, I feel slight pain when you press on it.

Doctor: Alright. Your tongue's mobility and sensory functions seem to be normal, and I don't detect any lymphadenopathy in the submandibular region on palpation. We'll need to conduct some laboratory tests and an enhanced computed tomography scan to get a clearer picture of the issue.

Patient: Okay, I understand.

[After the tests]

Doctor: Your lab results are all normal, and the enhanced computed tomography scan revealed a  $2.8 \times 1.8 \times 2.1$  cm-sized well-defined, solid, heterogeneous nodule that doesn't appear to involve the mandible. We also found a nodular lesion occupying the left floor of the mouth with abundant blood flow. No enlarged lymph nodes were detected in the submental or submandibular regions.

Patient: So, what does that mean, doctor?

Doctor: Based on these findings, our initial clinical impression is that this could be a benign salivary gland tumor, dermoid cyst, or benign connective tissue neoplasm. We will need to schedule you for surgery via an intraoral approach to remove the tumor and further examine it.

Patient: Alright, so what will the surgery involve?

Doctor: During the surgery, we'll make an elliptical incision around the periphery of the sublingual gland, and prepare a full-thickness tissue flap along the lingual aspect of the sublingual gland. After freeing the sublingual gland from its surrounding tissue, we'll find the well-circumscribed tumor without capsular extension beneath the body of the sublingual gland. We'll carefully free the submandibular gland duct and lingual nerve from the tumor surface, and completely excise the tumor along with the sublingual gland.

Patient: I see. What happens after the surgery?



Doctor: After the surgery, we'll fix the tissue sample with 10% formalin and submit it for histopathological diagnosis to determine the exact nature of the tumor.

Patient: Okay, thank you for explaining everything to me. I'm ready to proceed with the surgery and follow-up care.

Doctor: You're welcome. We'll make sure to take good care of you during and after the surgery. If you have any questions or concerns, don't hesitate to reach out to us.

### **Model Prediction/Inference:**

S: The patient reports a 6-month history of swelling in the left floor of the mouth, accompanied by difficulty swallowing but no pain or tongue paralysis. The patient feels slight pain when pressing the submucosal nodule.

O: Intraoral examination revealed a  $3.5 \times 3 \times 2$  cm solid, spherical submucosal nodule adjacent to the sublingual gland, covered with light bluish smooth mucus. The tongue's mobility and sensory functions are normal, and there is no lymphadenopathy in the submandibular region. Laboratory tests are normal. Enhanced computed tomography scan showed a  $2.8 \times 1.8 \times 2.1$  cm well-defined, solid, heterogeneous nodule without involvement of the mandible and a nodular lesion with abundant blood flow on the left floor of the mouth. No enlarged lymph nodes were detected in the submental or submandibular regions.

A: The primary assessment is a benign salivary gland tumor, dermoid cyst, or benign connective tissue neoplasm. Differential diagnoses could include benign connective tissue neoplasm.

P: The management plan includes surgical removal of the tumor via an intraoral approach via an intraoral approach. The surgery will involve an elliptical incision around the periphery of the sublingual gland, preparation of a full-thickness tissue flap along the lingual aspect of the sublingual gland, and excision of the tumor and the sublingual gland. Post-surgery, the tissue sample will be fixed with 10% formalin and submitted for histopathological diagnosis. The patient is scheduled for surgery and follow-up care. The patient is advised to reach out with any questions or concerns during and after the surgery.

### **Evaluation Scores (score from 1 to 10)**

**Accuracy:** Does the prediction correctly summarize the doctor/patient dialogue?

**Completeness:** Does the prediction include all key details from the doctor/patient dialogue?

**Consistency:** Does the prediction follow the SOAP format (Subjective, Objective, Assessment, Plan)?

**Feedback (optional):**

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## **CASE #9**

### **Input Text:**

Doctor: Hi there, can you please tell me about your past medical history?

Patient: Well, I had prostate cancer and underwent a prostatectomy.

Doctor: I see. And what brings you here today?

Patient: I've been experiencing tingling and numbness in my right arm and leg for at least a month.

Doctor: Do you smoke, drink alcohol, or use any drugs?

Patient: No, I don't smoke, drink alcohol, or use drugs.

Doctor: Your daughter mentioned that you've had an unsteady gait and needed assistance when moving. Is that correct?

Patient: Yes, that's true. It's been really hard for me to walk lately.

Doctor: Okay, let's review your vital signs from the day of admission. Your temperature was 97.9 F, heart rate 68 beats/min, blood pressure 137/84 mmHg, and respiratory rate 18 breaths per minute. You were alert and oriented to person, place, and time. Now, let's discuss your neurological examination findings. You showed right-sided hemiparesis and significant leg stiffness. Your strength in your right arm was 4/5, and in your right leg, it was 3/5. Your left side was unremarkable.

Patient: Yeah, I've been having difficulty moving my right side.

Doctor: We also found that your cranial nerves 2-10 were normal, but you had difficulty shrugging your right shoulder and couldn't turn your head to the left. When walking, your gait was unsteady, and you compensated with your non-affected side. The rest of your physical examination was within normal limits.

Patient: Okay, what about the tests you did on me?

Doctor: Your laboratory values were within normal limits. We performed a head computed tomography (CT) and a follow-up magnetic resonance imaging (MRI), which were both negative for a stroke. However, your cervical spine CT showed marked degenerative changes, including moderate to severe spinal canal stenosis at C4/C5.

Patient: Oh, what does that mean?

Doctor: We performed an MRI of your cervical spine without contrast, which confirmed the moderate to severe central stenosis with cord compression and mildly increased T2 signal at C4/C5 and C5/C6. There were degenerative findings between levels C3-C7, along with hypertrophy.

Patient: So, what's the next step, doctor?

Doctor: Based on these findings, we'll discuss potential treatment options and closely monitor your condition. It's important to follow up with your primary care physician and a specialist to address the spinal stenosis and any related symptoms.

**Model Prediction/Inference:**

S: The patient, a male with a history of prostate cancer and a prostatectomy, presents with a chief complaint of tingling and numbness in his right arm and leg for at least a month. He denies smoking, alcohol consumption, or drug use. He reports an unsteady gait requiring assistance and difficulty moving his right side.

O: Vital signs on admission included a temperature of 97.9 F, heart rate of 68 beats/min, blood pressure of 137/84 mmHg, and respiratory rate of 18 breaths per minute. Neurological examination revealed right-sided hemiparesis, significant leg stiffness, right arm strength of 4/5, and right leg strength of 3/5. Cranial nerves 2-10 were normal, but the patient had difficulty shrugging his right shoulder and turning his head to the left. Laboratory values were within normal limits. Head CT and follow-up MRI were negative for stroke, but cervical spine CT showed marked degenerative changes, including moderate to severe spinal canal stenosis at C4/C5 and cord compression. MRI confirmed moderate to severe central stenosis with cord compression and mildly increased T2 signal at C4/C5 and C5/C6, with degenerative findings between levels C3-C7 and hypertrophy.

A: The primary diagnosis is spinal canal stenosis secondary to spinal stenosis, with associated neurological deficits including right-sided hemiparesis and leg stiffness. Differential diagnoses could include other causes of neurological deficits, but these are less likely given the imaging findings and clinical presentation.

P: The management plan will include referral to a neurologist for further evaluation and management of spinal stenosis and associated symptoms. The patient will be closely monitored with regular follow-ups with his primary care physician and a specialist to address the spinal stenosis and any related symptoms. Education regarding the nature of spinal stenosis and its implications will be provided to the patient and his family to ensure understanding and compliance with the treatment plan.

**Evaluation Scores (score from 1 to 10)**

**Accuracy:** Does the prediction correctly summarize the doctor/patient dialogue?

**Completeness:** Does the prediction include all key details from the doctor/patient dialogue?

**Consistency:** Does the prediction follow the SOAP format (Subjective, Objective, Assessment, Plan)?

**Feedback (optional):**

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## **CASE #10**

### **Input Text:**

Doctor: Hello, how can I help you today?

Patient: Hi, I am a 76-year-old woman and my chief complaint is backache.

Doctor: I see. Can you tell me about your medical history?

Patient: Yes, I have hypertension and lumbar spinal canal stenosis.

Doctor: Have you been treated with an oral anticoagulant or antiplatelet agent for these conditions?

Patient: No, I haven't.

Doctor: When did you first notice the backache?

Patient: The discomfort started about 4 days ago without any obvious cause.

Doctor: Has your backache worsened since then?

Patient: Yes, it aggravated suddenly, and I also had vomiting and difficulty with body movement.

Doctor: Did you seek medical help for these symptoms?

Patient: Yes, I visited the Department of Surgery at your hospital and was admitted for examination and treatment.

Doctor: Were there any abnormal findings on thoracoabdominal CT or endoscopy from a surgical perspective?

Patient: They didn't find anything abnormal, so they referred me to your department.

Doctor: Alright, let's discuss your initial examination. Your body temperature was 36.2°C, blood pressure was 192/109 mmHg, and pulse was 79/min. You had a mild disturbance of orientation with a Glasgow Coma Scale (GCS) of E4, V4, M6. Have you experienced a severe headache along with the backache?

Patient: No, just the severe backache.

Doctor: Okay. During your neurological examination, we didn't find any hypesthesia or muscle weakness of the lower limbs. Your deep tendon reflexes were normal, and there were no abnormalities in hemorrhage and coagulation test findings. On plain radiography at admission, there were also no abnormal findings in the thoracolumbar vertebrae. We performed a lumbar spinal MRI 4 days after the onset, which showed a band-like shadow continuous from the thoracic spinal level, with high intensity on T1-weighted imaging and low intensity on T2-weighted imaging, and STIR. To examine the lesion at the upper level more closely, we performed a thoracic spinal MRI 7 days after the onset. It revealed a band-like shadow extending from Th2 to L3 on the subdural extramedullary ventral side. A mass was present in the shadow at Th7, compressing and deforming the spinal cord centered on this region, with

changes in intramedullary brightness of Th6.

Patient: That sounds concerning. What does it mean?

Doctor: It indicates that there is a mass compressing your spinal cord which might be causing your backache and other symptoms. We will need to perform further tests and discuss potential treatment options with you.

Patient: Okay, thank you for explaining everything to me. I appreciate your help.

### **Model Prediction/Inference:**

S: The patient is a 76-year-old woman presenting with a chief complaint of severe backache, which began 4 days ago without an obvious cause. The backache worsened suddenly, accompanied by vomiting and difficulty with body movement. She has a history of hypertension and lumbar spinal canal stenosis. She has not been treated with an oral anticoagulant or antiplatelet agent.

O: Physical examination revealed a body temperature of 36.2°C, blood pressure of 192/109 mmHg, and pulse of 79/min. The patient exhibited mild disturbance of orientation with a Glasgow Coma Scale score of E4, V4, M6. Neurological examination showed no hypesthesia or muscle weakness, normal deep tendon reflexes, and no abnormalities in hemorrhage and coagulation tests. Thoracoabdominal CT and endoscopy were unremarkable. Plain radiography showed no abnormalities in the thoracolumbar vertebrae. Lumbar spinal MRI revealed a band-like shadow extending from Th2 to L3 on the subdural extramedullary ventral side, compressing and deforming the spinal cord at Th7, with changes in intramedullary brightness of Th6.

A: The primary assessment is a mass compressing the spinal cord, likely causing the severe backache and associated symptoms. Differential diagnoses could include other causes of spinal cord compression, but these are less likely given the imaging characteristics and clinical presentation.

P: Plan to conduct further diagnostic tests including MRI of the spinal mass and possibly a CT scan of the spine to assess the extent and nature of the mass. Continue monitoring vital signs and neurological status closely. Educate the patient on the importance of adhering to follow-up appointments and adhering to the treatment plan. Arrange for a follow-up appointment in one week or sooner if symptoms worsen.

### **Evaluation Scores (score from 1 to 10)**

**Accuracy:** Does the prediction correctly summarize the doctor/patient dialogue?

**Completeness:** Does the prediction include all key details from the doctor/patient dialogue?

**Consistency:** Does the prediction follow the SOAP format (Subjective, Objective, Assessment, Plan)?

**Feedback (optional):**

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